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NORTHERN ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

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CHEMICAL FIREPROOFING OF CURED GRASS

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The protection of building and other facilities from the danger of grass fires has troubled many agencies in this region for many years. Foresters have discussed and looked for some inexpensive method of treating roadside strips. Lumber companies have tried salt and other methods of preventing rank and inflammable growth of grasses and weeds in their lumber yards. Most recently the Army and Navy have requested advice on the fireproofing of grasses around buildings and airplane runways. Here the soil and sod must not be injured because grass growth is essential as a dust preventative. Recent work by the Bureau of Plant Industry indicates that chemical fireproofing without soil injury is possible. Its practicability depends, of course, upon the cost and labor required per treatment and the number of treatments needed during a fire season.

Several years ago our Forest Products Laboratory at Madison, Wisconsin found monoammonium phosphate to be an effective fire retardant in lumber, but no tests were made on grasses or other vegetation. A private development in California was given considerable publicity in several national magazines a year or two ago, but the chemicals used were "secret" and as purchased from this concern were exhorbitantly priced. Furthermore, there was no information available to reveal their effectiveness after rains or local showers had perhaps washed out the chemicals. Obviously a chemical which might be satisfactory in a region having practically no summer precipitation would be of much less value here in our region where showers or good rains normally occur two or three times a month.

We have just been notified by our Washington office that further investigations have recently been made by experts of the Bureau of Plant Industry at the request of the Army. The experiments were performed in Oklahoma in March 1943 in heavy stands of cured Bermuda, Buffalo, Blue Grama, and Weeping Love grasses. The fires were set in winds of from 10 up to 21 miles per hour. Four chemicals were tried, one of them being a "wetting agent" which makes water wetter and thereby aids penetration of the other chemicals into the vegetative tissue.

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Two chemicals, monoammonium phosphate ($NH_4H_2PO_4$, food grade) and phosphoric acid (H_3PO_4, 85 percent food grade), plus a small amount of the wetting agent (Aerosol, OT, 100 percent or Vatsol, OT, 70 percent) are recommended. The first chemical is easier to handle because it comes as a solid in paper bags. Phosphoric acid, however, is a corrosive liquid. Both the phosphate and the acid are readily obtainable through chemical supply houses including the Anaconda Sales Company at Anaconda, Montana. The American Cyanamid Company of San Francisco sells Aerosol in the dry form at only a fraction of the cost when purchased as a liquid under some "trade" name. Although the reports furnished to us do not state whether or not these chemicals might be injurious to livestock eating the treated grass, monoammonium phosphate is known to be one of the ingredients of baking powder and is therefore probably not dangerous. The third chemical tested (propyl phosphoric acid) was not recommended because it is difficult to obtain. "The solution for spraying should contain about one pound of ammonium phosphate or (one pound of) 85 percent phosphoric acid per gallon of water and 0.1 percent of wetting agent. The amount to be sprayed on the grass at one application will be determined for the particular grass to be treated."

The experiments indicated that for every 100 pounds of grass about 15 pounds of solution should be applied. Application should be by a fine spray applied at such a rate that the grass can absorb it. Naturally that which runs off the plant and onto the ground is wasted. The volume of chemical required will vary, of course, with the density of the stand of grass but probably will not amount to more than 250 pounds per acre for 1600 to 1700 pounds of dense cheatgrass per acre in this region. On a strip basis this would indicate a maximum of 250 pounds of solution for a strip 20 feet wide by 2200 feet long. This quantity of solution would consist of 27 gallons of water (225 pounds) plus 27 pounds of ammonium phosphate and about one-fourth pound of "Aerosol, OT, 100 percent" in the dry form. The chemicals would cost around $20 to $25 for this quantity.

Application could be by use of the standard back pack cans and trombone pumps used in firefighting, with the spray nozzle attachment in place. Unfortunately, however, both the monoammonium phosphate and the phosphoric acid leach readily when subjected to rain and a sprinkle of more than 0.07 inch precipitation is reported to "remove enough of the retardant to permit burning."

Because of this easy loss of effectiveness and because of the cost and labor of application, it seems doubtful that this method will be of widespread value in the northern Rocky Mountain region. The information is therefore of primary value by heading off similar experiments by inexperienced personnel and by indicating that either mowing and removal or burning in place are the most effective grass fire preventatives in our region.